The Polish Grid: A Critical Factor for Your Solar Factory's Success

A Factual Overview for Industrial Investors in Central Europe

Content Partner: J. v. G. technology GmbH

Turnkey solar module production lines — since 1997

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Technical Overview: Grid Connectivity for Solar Factories in Poland

Created as part of the PVKnowHow Knowledge Network

Prepared by J.v.G. Technology GmbH

European specialists in turnkey solar module production lines

Key Project Data

50 MW	1–1.5 M…	12–24 …	Poland
Factory Scale	**Power Demand**	**Ramp-Up Period**	**Region**
Solar module production capacity	Required grid connection capacity	Typical timeline to secure grid connection	Central Europe / EU industrial zone

Main focus: Grid connection & energy strategy · Source: PVKnowHow / J.v.G. Technology GmbH

Why Grid Access Matters for Solar Factories

The Core Challenge

- A solar module factory is an energy-intensive operation requiring stable, substantial power supply
- 1–1.5 MW grid connection is a prerequisite — not an afterthought
- Grid access must be secured before or in parallel with facility construction
- In Central Europe, grid connection can take longer than constructing the factory building itself

Business Impact

- Delayed grid connection = delayed production ramp-up = revenue loss
- Undersized connection limits automation and throughput capacity
- Energy cost directly affects module manufacturing cost competitiveness
- Proactive energy planning is a cornerstone of a viable business plan

Poland's Energy Transition: Overview

Coal-Heavy Legacy

- Coal accounted for ~57% of Poland's electricity mix in 2024 — highest in the EU
- Coal-dependent infrastructure creates pricing volatility linked to EU ETS carbon costs
- EU carbon prices have risen significantly, making fossil-based generation costly

Rapid Renewable Growth

- Poland reached 31.8 GW of renewable capacity by end of 2024 (~44% of total installed)
- Record 29% of electricity from renewables in 2024, up from 26% the prior year
- Poland deployed ~4 GW of new PV capacity in 2024 alone

Grid Modernisation Pressure

- 53% of TSO overhead lines and 49% of DSO lines are over 40 years old
- Grid investment CAPEX by operators grew between 2023 and 2024
- March 2025: most extensive reform of grid connection rules in over a decade proposed

Industrial Electricity Cost Challenges

Price Level Context

- Business electricity rates in Poland are ~168% of the world average price
- Wholesale day-ahead prices reached ~444 PLN/MWh in October 2024
- The 2022 energy crisis saw Polish electricity prices peak at €270/MWh

Industrial Bill Composition

- **Energy charge (cena energii czynnej):** cost per MWh consumed — most exposed to market fluctuations
- **Distribution fee (opłata dystrybucyjna):** covers transport through DSO network
- Additional charges: capacity charge, RES levy, transmission fee, quality charge, subscription fee

Structural Price Drivers

- EU ETS carbon costs continue upward trajectory — projected toward €130/t CO_2 by 2030
- High coal dependency transfers carbon cost directly to electricity price
- Industrial consumers have no household-style price freeze protection

TSO vs. DSO Structure in Poland

Criterion	TSO — Polskie Sieci Elektroenergetyczne (PSE)	DSO — PGE, Tauron, Enea, Energa
Role	National high-voltage transmission "motorway"	Regional medium- and low-voltage distribution "local roads"
Who Connects Here	Very large facilities; direct HV connection	Most industrial factories — standard connection point
Oversight	Energy Regulatory Office (URE)	URE-approved tariffs; legally unbundled since 2007
Transparency	Regularly publishes detailed connection request list	Required to publish available capacities only; no queue details
Relevance for 1–1.5 MW Factory	Not typically applicable at this scale	Primary operator for grid connection application

Grid Connection Process Overview

1

1 — Land & Legal Preparation

Secure legal title to property (ownership deed or long-term lease)

Required as prerequisite before formal DSO application can be submitted

2

2 — Application for Connection Conditions

Submit formal application to relevant DSO with: location, required capacity (MW), and technical specifications

New rules (2025): advance payment of 60 PLN/kW of requested capacity required

3

3 — Grid Capacity Assessment

DSO evaluates whether existing infrastructure can accommodate load

Grid reinforcement may be required — adds cost and time

4

4 — Construction & Commissioning

DSO undertakes construction work: new cables, substation, or extension

Timeline is highly variable — a major risk factor for project planning

5

5 — Connection Agreement & Go-Live

Formal grid connection agreement signed; operational tariff group assigned

Factory operational expenditure now directly driven by electricity tariff

Timeline Risks & Delays

Key Risk Factors

- Grid connection in Central Europe can take longer than factory construction itself
- DSO connection queues lack transparency — no public detail on size or composition
- Speculative applications clog the queue; 2025 reform doubles advance payment to deter this
- Grid capacity constraints common in areas with high renewable density
- Aging infrastructure: 49–53% of lines are over 40 years old — reinforcement takes time

Mitigation Strategies

- Begin grid connection process as early as possible — ideally at project inception
- Engage DSO before finalising site selection to assess local capacity
- Consider flexible connection agreements where available (new 2025 rules)
- Plan production ramp-up assuming a 12–24 month grid connection timeline
- Engage an experienced project team with local regulatory knowledge

Industrial Electricity Tariff Structure

Energy Component

- Core electricity purchase cost (PLN/MWh)
- Most exposed to wholesale market fluctuations
- Competitive supply contracts available; suppliers compete on this element

Network & Distribution

- DSO distribution fee: transport through regional network
- Fixed and variable network charges apply
- Tariff rates set by DSOs and approved by URE regulator

Regulated Levies

- Capacity charge (mocowa): system security contribution
- RES charge: supports renewable energy subsidy system
- Cogeneration charge, quality charge, transitional charge, subscription fee

Tariff Group Assignment

- Industrial consumers classified by voltage level and load profile
- Tariff group determines applicable rate structure and network charges
- Dynamic tariffs becoming available following August 2024 legislation

Strategic Importance of Energy Planning

1

Cost Competitiveness

Energy cost is a direct input to module manufacturing cost — must be modelled from day one of project planning

2

Operational Continuity

Stable, sufficient power supply is a prerequisite for automated, continuous production — interruptions create scrap and quality failures

3

Investment Case

Grid availability, tariff structure, and energy cost trajectory must be stress-tested in the financial model before committing to a site

An experienced European turnkey provider integrates energy and grid planning into full factory development methodology — reducing risk for new manufacturers entering production.

On-Site Solar Generation Strategy

Rooftop & On-Site PV

- Factory roof area suitable for self-generation of a portion of electricity demand
- Offsets grid consumption during peak solar hours — direct reduction in energy charge
- Net-metering and prosumer frameworks available in Poland for industrial facilities

Strategic Value

- Reduces dependency on volatile wholesale market pricing
- Demonstrates product-in-use alignment — factory uses what it manufactures
- Supports ESG reporting and scope 2 emissions reduction for end-customer requirements

Planning Considerations

- On-site generation does not replace grid connection — base load still requires grid supply
- Generation profile must be matched against factory shift patterns and consumption peaks
- Battery storage can increase self-consumption ratio and reduce grid peak demand charges

FAQ Highlights

Can we start the grid connection application without owning the land?

No. Polish regulations require proof of legal title to the property as part of the initial DSO application. Securing the site is a prerequisite.

Is Poland a viable location for a solar module factory?

Poland offers a large domestic market, skilled industrial workforce, and EU strategic location. Grid challenges are manageable with proper advance planning.

How long does grid connection realistically take?

Based on experience from turnkey projects in Central Europe: 12–24 months must be assumed. In some cases it exceeds building construction time.

Can we reduce electricity costs after connection?

Yes — through on-site solar generation, optimised tariff group selection, energy storage, demand-side management, and competitive supplier contracts.

Strategic Conclusion

Start Early

Grid connection must begin at project inception — not after factory design is complete. 12–24 months is the realistic planning horizon.

Understand the Costs

Industrial electricity in Poland is a composite bill — energy, distribution, and levies. Each element must be modelled separately in the investment case.

Plan for Volatility

Poland's coal-heavy grid creates structural price exposure. On-site solar and demand management are valid tools to reduce long-term cost risk.

Key takeaway: For a 50 MW solar factory in Poland, grid connection and energy strategy are not infrastructure footnotes — they are critical path items that determine project viability and manufacturing cost competitiveness.

About the Content Partner

J. v. G. technology GmbH — The DESERT Company

Founded in 1997 in Bavaria, Germany. Family-owned engineering company specializing in turnkey solar module production lines.

More than 90 factory projects delivered worldwide.
On-site team training included — no prior manufacturing experience required.

Key areas:

Turnkey PV manufacturing lines | DESERT Technology® | TÜV-certified module designs | Factory planning to production

www.jvg-thoma.com

Contact

J.v.G. Technology GmbH

Möningerberg 1a, 92342 Freystadt, Germany

info@jvg-thoma.de | www.jvg-thoma.com

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